

Application No. 10/689,817
Response to Final Office Action

Customer No. 01933

R E M A R K S

Reconsideration of this application is respectfully requested.

THE PRIOR ART REJECTION

Claims 1-3 were rejected under 35 USC 103 as being obvious in view of the combination of previously cited USP 6,213,596 ("Nowell, Jr. et al"), newly cited JP 01-120353 ("Yamamori et al" which was cited by the Examiner as "Seiji et al") and newly cited USP 6,685,296 ("Mochizuki et al"). This rejection, however, is respectfully traversed.

According to the present invention as recited in claim 1, an ink jet recording apparatus is provided which comprises: (i) an ink jet head that discharges supplied ink from a nozzle; (ii) a deaeration device that deaerates dissolved gas from the ink supplied to the ink jet head; (iii) an ink reservoir that is provided in an ink channel between the deaeration device and the ink jet head; and (iv) a preventative member that floats on the surface of the ink in the ink reservoir and prevents contact between the ink and air. In addition, according to the present invention as recited in claim 1, a level of a surface of the ink in the ink reservoir is different from a level of the nozzle such that negative pressure is applied to the ink in the nozzle.

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As recognized by the Examiner, Nowell, Jr. et al discloses an ink cartridge 12 that has a printhead, an air removal device 28 for removing air from ink to be supplied to the cartridge 12, and a tank 46 between the air removal device 46.

On pages 2-3 of the Office Action, the Examiner asserts that in Nowell, Jr. et al "the ink level in the ink reservoir (46) is higher than the ink level in the nozzle of the ink cartridge (12) so that the difference between the ink levels would provide a negative pressure for the nozzle due to gravity force since [sic]." It appears, however, that the Examiner may be misinterpreting the term "negative pressure" to mean "positive pressure."

That is, it is respectfully pointed out that "negative pressure" clearly means pressure that urges the ink in the nozzle away from the opening in the nozzle, whereas "positive pressure" means pressure urging the ink out of the ink jet head through the nozzle. See, for example, page 2, lines 4-12 of the specification of the present application, which explains that applying negative pressure to the ink in a nozzle prevents leakage from the nozzle. See also page 5, lines 6-10 of the present application.

By contrast, since the cartridge 12 of Nowell, Jr. et al is lower than the tank 46 thereof, the difference in the level of the surface of the ink in the tank 46 does not apply negative pressure to the ink in the nozzle of the cartridge 12.

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Yamamori et al and Mochizuki et al, moreover, have been cited by the Examiner as disclosing a "preventive member" corresponding to the preventive member of the claimed present invention, which, as recited in claim 1 floats on the surface of the ink in the ink reservoir and prevents contact between the ink and air, and which comprises, for example a plurality of balls (claim 2) or a plate (claim 3).

In Yamamori et al, the Examiner asserts that floats 3 correspond to the preventive member of the claimed present invention. It is respectfully pointed out, however that floats 3 of Yamamori et al have a magnetic body and are provided to enable detection of a location of the surface of the ink.

In Mochizuki et al, the Examiner asserts that float body 703 with electrodes 704 corresponds to a floating plate preventive member and that metal ball 804 corresponds to a floating ball preventive member. It is respectfully pointed out, however, that body/electrodes 703/704 and ball 804 of Mochizuki et al are merely provided so as to contact electrodes 702, 801-802 when the amount of ink in the tank 701 or cartridge 805 is low.

It is respectfully submitted that the preventive member recited in claim 1 is not merely a random structural component that would be obvious to incorporate absent the other features of the present invention as recited in claim 1. Instead, as recited

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in claim 1, the claimed present invention is a combination of features whereby ink is deaerated and temporarily stored after deaeration in an ink reservoir which is positioned between the deaeration device and the ink jet head, and in which a level of a surface of the ink is different from a level of the nozzle such that negative pressure is applied to the ink in the nozzle. And according to the present invention as recited in claim 1, the preventive member floats on the surface of the ink in the ink reservoir under these conditions to prevent contact between de-aerated ink and air.

That is, the preventive member of the claimed present invention is employed in the claimed structural arrangement in which the ink reservoir is provided between the deaeration device and the ink jet head and in which the level of the surface of the ink is different from the level of the nozzle such that negative pressure is applied to the ink in the nozzle, so as to prevent re-dissolution of gas in the deaerated ink.

As explained hereinabove, Nowell, Jr. et al does not disclose, teach or suggest that the level of the surface of the ink is different from the level of the nozzle such that negative pressure is applied to the ink in the nozzle. In addition, as acknowledged by the Examiner, Nowell, Jr. et al does not disclose the preventive member of the claimed present invention.

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It is respectfully submitted, therefore, that the mere existence of objects floating in ink for purposes completely unrelated to the dissolution of gas in Yamamori et al and Mochizuki et al, would not suggest a structural arrangement as recited in independent claim 1, whereby a deaeration device deaerates dissolved gas from the ink supplied to the ink jet head, an ink reservoir is provided in an ink channel between the deaeration device and the ink jet head, a level of a surface of the ink in the ink reservoir is different from a level of the nozzle such that negative pressure is applied to the ink in the nozzle, and a preventative member floats on the surface of the ink in the ink reservoir and prevents contact between the ink and air.

In view of the foregoing, it is respectfully submitted that the present invention as recited in claim 1 and claims 2 and 3 depending therefrom clearly patentably distinguishes over Nowell, Jr. et al, Yamamori et al and Mochizuki et al, taken singly or in any combination consistent with the respective fair teachings thereof under 35 USC 103.

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Allowance of the claims and the passing of this application to issue are respectfully solicited.

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If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,


Douglas Holtz
Reg. No. 33,902

Frishauf, Holtz, Goodman & Chick, P.C.
220 Fifth Avenue - 16th Floor
New York, New York 10001-7708
Tel. No. (212) 319-4900
Fax No. (212) 319-5101

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